



Photo by Sheldon Lowenthal

## Burton renovations proceed on schedule

The structural renovations of Burton House are nearly completed, according to P.F. Barrett, construction manager for physical plant.

At the present time, the "finish work," painting, and tiling are underway in the eastern wings of the building, although on the Conner side, the sheet rock and plaster walls have just been put up.

The renovations have proceeded fairly quickly, Barrett said, because the superstructure is much the same. The floors, stairwells and corridors are structurally the same, although the students "won't recognize it."

There will be some outside work done. The parapet on the roof has already been altered and the windows replaced. In the back, a loading dock will be

Whitney M. Young, a recently-elected member of the MIT Corporation, died suddenly yesterday while attending a conference in Lagos, Nigeria. Young was director of the National Urban League since 1961 and one of the first blacks to be elected to the Corporation.

built, and some of the land in the rear will be utilized as a "house recreational area."

Since there will be fewer people living there (about 300 compared to 500), the dining hall may be reduced in size, and space be made available for house activities. A decision will

be reached within a few months.

So far, the schedule originally set up has been adhered to. Barrett hopes that the construction will be completed by July to allow time to completely furnish Burton before the September occupancy. The delays that plagued the construction of MacGregor, strikes by key unions, will not hold up Burton as there are no union contracts expiring this summer.

## IFC attempts revitalization

By Alex Makowski

The MIT Interfraternity Conference (IFC) is attempting a reorganization and revitalization to stave off pressures for collapse that have been building gradually over the past few years.

During the past three weeks, presidents from more than 20 of MIT's 29 fraternity chapters have met twice to discuss both the roles the IFC could be filling and needed improvements. Though no drastic changes were made, most IFC members emerged convinced that the group was necessary to further the common well-being of the houses.

Another development from the two meetings was the election of new officers. Harwell Thrasher, a charter member of the new Pi Kappa Alpha chapter,

## Anti-war actions due here

Anti-war activity at MIT will increase this weekend with a teach-in scheduled for Kresge at eight tonight and a march to the Center for International Studies (CIS) set for Monday.

A good turnout is likely for the Kresge teach-in: it marks the first mass action on the War since the meetings following last spring's invasion of Cambodia.

Noam Chomsky will be the featured speaker tonight. Only last spring he himself visited Laos, and during the May peace demonstrations he described the effect America's undeclared air war has had on that country.

Other speakers will include David Deitch, financial columnist for the *Boston Globe*, Dan Ellsberg, past State Department Vietnam official, and Cynthia Frederick, who worked with the American Friends as a volunteer in South Vietnam. Deitch will discuss what connection the discovery of offshore oil on the South Vietnamese coast may have with the prospect for peace. Another speaker will be Fred Branfman, former *Dispatch* News Service correspondent who spent three and a half years in Laos observing much of the fighting there first hand.

Both the Science Action Coordinating Committee (SACC), and the New University Con-



The CIS has been the target for past anti-war demonstrations. During November, 1969, several hundred youths massed in the plaza by the Hermann Building.

ference (NUC) are claiming credit for sponsoring the rally.

In other developments, MITSOS announced in an unsigned leaflet Wednesday a rally and march aimed at "Smashing CIS at MIT."

Claiming that CIS conducts counter-insurgency research used directly by the US government in exploiting the Third World, MITSOS distributed posters and leaflets urging students to rally

at 77 Mass. Ave. Monday noon and then "march on CIS."

Several CIS faculty and researchers and their publications were attacked by the leaflet, among them Lucian Pye's *Guerilla Communism in Malaya*, and *The Roots of Insurgency and the Commencement of Rebellions*, and Ithiel DeSola Poole's work with Project CAM and Vietnamese opinion and communication.

The CIS has come under attack several times in the last few years. In the fall of 1969, work at the CIS was disrupted for the better part of a day as many students debated CIS faculty over the merits and uses of their research. Later that year, the CIS was the first target of the November Actions, with the November Action Coalition claiming a victory after MIT ordered the building closed to forestall the possibility of violence.

MIT has stationed campus police inside the Hermann Building since it received numerous bomb threats last year about the time the Harvard Center for International Affairs was extensively damaged by a bomb.

scribe to the services offered by the Purchasing Manager's Council (PMC), a group formed to represent the fraternities in large-order contract negotiations with Boston food suppliers, others objected to the planning behind the IFC-sponsored beer blast that cost each house roughly \$100 when it fell through.

Some resented the activist political role onetime chairman and SDS member George Katsiakis tried to force on the fraternity system. A last major complaint (Please turn to page 6)

## Schulte bares ideas for GA replacement

By Curtis Reeves

Newly elected UAP, Bob Schulte, has announced plans for a major reorganization of student government.

"What we intend to do is write a new constitution," he began. Along with UAPV John Krzywicki he plans to meet with "as many people as we can — faculty, administrators, staff, students on student-faculty committees, heads of dorms — anybody who can give us input on what student government has done in the past and isn't doing now."

Change GA

According to Krzywicki, one of the provisions of the new document would be for a type of representative body different from the General Assembly. The proposed council would be composed of house presidents and, from the dormitories, other house officials. Schulte explained: "So far, everything has been concentrated on living groups since communication is better there."

Giving and receiving inputs is a big problem for the team. Says Schulte, "Communication is probably the biggest watchword here." To encourage students to speak more, "we intend to be a lot more visible. We'd like to make this office more open," Schulte commented. The fourth floor Student Center office has taken on a new, less cluttered air, and plans are underweigh for more improvements. "We spent the first few days just going through things, throwing away things that were useless, finding out a lot about our jobs."

'Flexible'

"As far as any set programs we have, there aren't any. We've got to be flexible for a while."

The flexibility of the new crew will be tested within the next two weeks. An Agenda Committee meeting on Monday and a meeting of GA eight days later will decide the future of the undergraduate government, though the final choice will be made in a student referendum (Please turn to page 5)

## Study asks college reforms

From The Boston Globe

A Federal task force said Monday that too many American young people are forced to go to college against their will and that a large number — nearly two-thirds — find traditional academic training so unsuited to their needs that they leave before graduating.

These youths would be better served, the group said, if there were respectable alternatives to conventional colleges, if their non-college experiences were recognized in the job market, and if students' chances for a college education weren't forfeited once they passed their early twenties.

The task force comments were contained in a 140-page study of American higher education commissioned by Robert Finch, former secretary of health, education and welfare,

and presented recently to his successor, Elliot L. Richardson. The report, prepared by a nine-member group headed by Stanford University administrator Frank Newman, was released Monday at a Washington news conference.

Dramatic growth

The report said American higher education has grown dramatically since World War II so that today more than half of the country's young people enter college. But it said several "disturbing trends" have developed that indicate a need for sweeping, fundamental reform.

Among the trends cited were these:

**The Credentials Monopoly** — Businesses, educational institutions and other employers now almost universally insist that job applicants have at least four

years of college. The college degree has become an "admission ticket" into the job market and other kinds of experience do not count for as much as they once did.

**The Academic Lockstep** — Strong social pressures, including the need to acquire job credentials, have combined to force young people to go directly from high school into college and then often on to graduate school. The country has made "a massive social assumption that to be in college is the most acceptable thing one can do at age 18," the report said. Other pressures that lead students in this direction are the desire to avoid the draft, pressure from parents and friends and the stigma of dropping out.

**The Age Barrier** — Students (Please turn to page 2)

# Faculty now evaluate admission prospects

# Study asks college reforms

By Pete Materna

Five newly-introduced teams, each consisting of an admissions officer and two faculty members, reviewed and decided on about 35% of this year's undergraduate applications, instead of having them handled almost completely by people on the admissions staff.

In cases processed by the staff of the admissions office alone, the persons who read through all of the recommendations, high school records and other materials which comprise a full admissions folder are usually not the persons who actually render a decision on the applicant.

The decision is made by a group which usually reads only an abbreviated summary of the folder and the comments of the people who read all of it. In the faculty groups, however, the professors and admissions officer all read the whole folder and decided on the applicant.

Electrical Engineering Professor Mildred Dresselhaus, a team member, explains that out of any group of applicants there are some who are so clearly acceptable that a relatively brief review is sufficient for a good decision; also here are those who are clearly unacceptable. Between these there is a middle ground of about 20 to 30% of the applicants, on whom a decision can be quite difficult. It is to these applicants that the faculty teams were able to devote much more attention than they would normally have received.

## Benefit to faculty

In the view of some of the participants, the most direct benefit from this innovation is not its effect on the entering class, but its effect on the faculty, which until now had much less contact with the admissions process. Past participation was limited to applying the team method only to women's applications; and to individual professors reading some of the other folders but playing no role in the final decisions.

Professor Dresselhaus felt "the experience is valuable in getting insight into the types of youngsters who come here." She added that it may help in planning course activities. Indeed, as Mr. Eugene Chamberlain of the admissions staff emphasized, compared with last year's class the effect of a procedure change like this could be small compared to that wrought by change in powerful outside forces such as MIT's general reputation, economic conditions, and engineering employment prospects.

## Results uncertain

Definite knowledge of the experiment's effects will probably not be obtained until a planned study is completed. For instance, it is not known how much better or worse the faculty as a whole is informed about admissions because of this.

As pointed out by Aeronautics professor Harold Wachman, a team member, there is yet no way of saying that decisions reached by a faculty team are necessarily any better or more valid than the more cursory ones made in the past, or even any different from them.

The followup process is only beginning now, with the compilation of statistics. Later on it may include a more personal survey of a portion of the college career, or a control experiment in the admissions office. Nevertheless, since the persons who render the decisions get a much deeper knowledge of the applicants (especially those applicants who are hard to decide on), the participants feel that the method itself is much better, Wachman, expressing his feelings on the program, thinks it is a good idea which should be continued and expanded. The faculty should become involved and stay involved.

(Continued from page 1)

are also forced into college in their late teens because they understand that their chances of getting a college education in later life are minimal. Because most college degrees are acquired on campus and on a full-time basis, students know that the older they get the more difficult it will be to break away from a job or family responsibilities to start or continue study.

**Uniformity of colleges** — As colleges and universities have tried to emulate Harvard and Berkeley and as huge multi-campus state systems have developed over the last two decades, all institutions of higher learning have become more or less uniform in the kind of persons they have on their faculties and in their teaching methods and course offerings. The "academic mode," in which professors lecture and students read assigned books, has become the accepted form of education in most colleges.

The trouble with a higher education system built on these social realities is that it doesn't

work well for all the people we now assume should go to college, the report said. Particularly in unselective institutions, the report said that "a surprisingly large and growing number of students... voluntarily drop out," citing dissatisfaction as the main reason.

## Two-thirds leave

Of more than one million students who enter college each year, the report said fewer than half complete two years and only about a third stay four years.

Many of these people might perform well in jobs if there was loosening of stiff degree requirements by employers, the report said. Others would profit from time off — for work, travel or volunteer service — to return to college once they were better motivated. Some simply suffer from an inability to learn via the usual lecture-reading method.

The task force said now is an opportune moment for reform because there is self-doubt in the academic community about the current structure of higher education and because public dissat-

isfaction has threatened its financial support.

## Reforms

Among the reforms it proposed were:

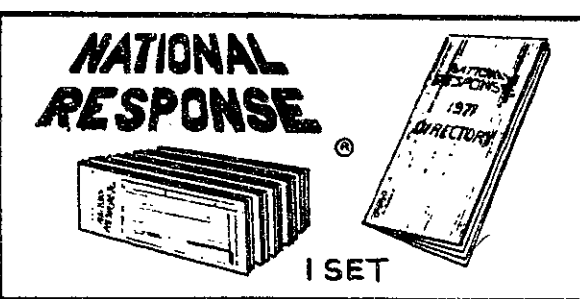
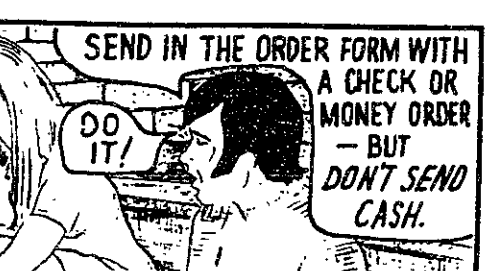
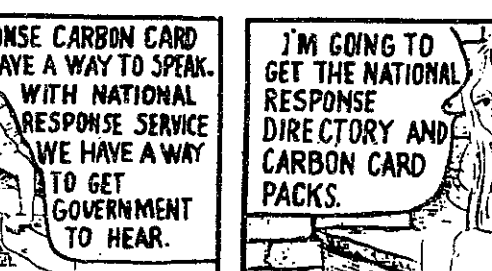
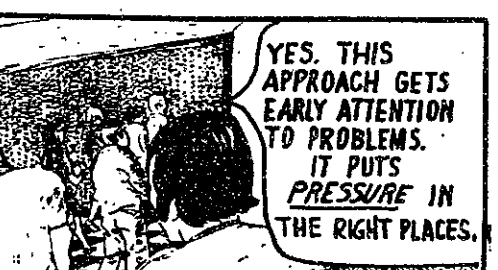
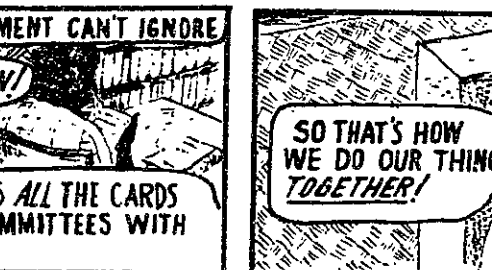
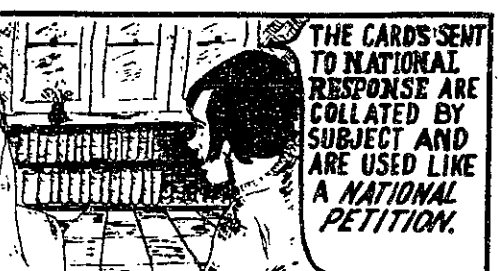
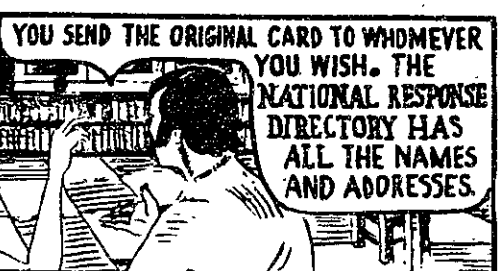
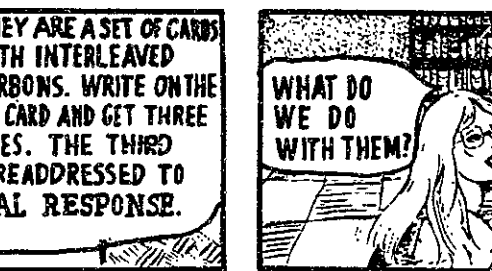
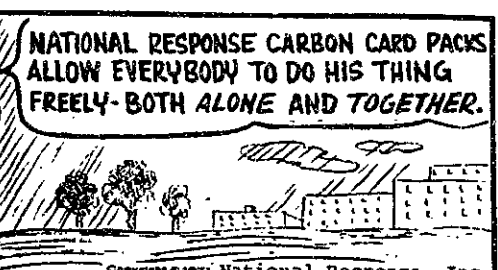
Creation of "new types of colleges" that de-emphasize classroom work and utilize instructors with experience outside of the academic world.

Recognition of credentials from these new colleges by employers.

Changes in admissions and financial aid policies that encourage students to drop in and drop out of college without penalties so they can mix traditional studies with internships, apprenticeships and other experiences.

Use of television, night classes, correspondence courses and tutoring to allow older people a "second chance" to continue their studies on a part-time basis, on or off campus.

Creation of "regional examining universities" that would give tests and award degrees to persons who have utilized these methods.



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# Malnutrition damages early nerve cells

MIT scientists have found direct biochemical evidence of damage to brain neurons (nerve cells) due to malnutrition during the few weeks before and after birth.

In the MIT studies, the brains of rats that were undernourished from mid-gestation and killed at weaning contained 25 percent less norepinephrine than the brains of adequately fed control animals. The chemical, norepinephrine, is a neurotransmitter — neurons in the brain use it to communicate with one another.

#### Signal process

Signals travel electrically through the long body of a neuron until they reach a synapse, the connecting gap between the endings of two neurons. When the signal along one neuron reaches the synapse, it causes a chemical neurotransmitter to be released into the small space between the cells. The neurotransmitter chemically triggers the next neuron. If there is an inadequate supply of neurotransmitter for the neuron to release, then the normal passage of signals cannot take place.

Writing in the current issue of the journal *Science*, William J. Shoemaker, a graduate student, and Dr. Richard J. Wurtman, professor of endocrinology and metabolism in MIT's Department of Nutrition and Food Science, report what Wurtman calls a "first small step in understanding how protein malnutri-

tion affects brain neurons."

There has been mounting evidence that inadequate protein early in life — in people — interferes with the development of the brain, with the ability to learn, and with behavior. Several investigators, notably Dr. Myron Winick and his associates at the Cornell University Medical School, have discovered chemical changes in the brains of malnourished animals and children. However, these changes — in the amounts of DNA and fatty substances — might reflect disturbances in the supporting cells of the brain or in the myelin membranes that insulate the neurons.

Different kinds of neurons use different kinds of chemicals as their neurotransmitters. Those which release norepinephrine are known to have a role in the control of mood, in the learning process, and in the control of blood pressure, heart rate, blood sugar, and glandular function. Another neurotransmitter, dopamine, also was found to be deficient in undernourished rats in the MIT studies, but this effect was not nearly as dramatic as the effect on norepinephrine. Low brain dopamine levels previously have been noted in Parkinson's disease.

The work of Shoemaker and Wurtman may be applicable to the study of human diseases. Kwashiorkor, for example, is a condition of acute protein star-

vation which appears among children one to three years old in economically undeveloped areas. Even when an afflicted child grows to adulthood, Wurtman explains, his behavior and learning ability may be impaired.

Preliminary results of research on kwashiorkor being conducted by MIT scientists in Guatemala suggest that similar changes in norepinephrine metabolism take place in the

human brain under conditions of inadequate protein early in life. Wurtman cautions, however, that the preliminary results for humans do not constitute conclusive evidence.

Dr. Wurtman does not yet know if the norepinephrine deficiency in rats results from fewer norepinephrine-containing neurons, or because there is less neurotransmitter present in each of a normal number of neurons.

If the number of neurons is

normal, then the disorder might be reversible by correcting the dietary protein deficiency or by drugs. However, if the number of norepinephrine neurons is depressed, the disorder may be incurable, since brain neurons lose the ability to divide long before the rest of the body is mature. Future studies with rats and primates may provide insights into the reversibility of these changes in brain norepinephrine.

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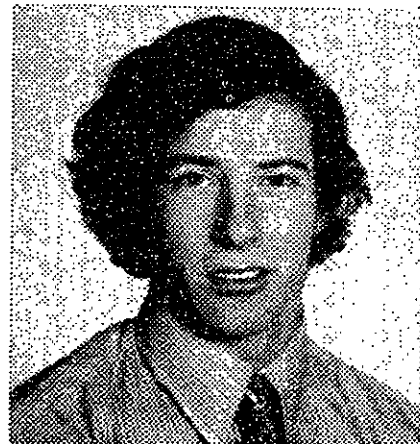
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Suggested improvements

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## Anti-war push:

# Prospects for success

By Steve Carhart

One of the speakers at the Harvard teach-in last week said that politics is the art of doing what needs to be done again and again until you succeed. At the threshold of spring, 1971, the Indochina war is now longer than any previous American conflict. The mood in the anti-war movement since Cambodia has been one of despair over the possibility of ever ending our involvement in southeast Asia. And yet, as preparations seem to be underway for another assault on our war policy, I believe that the prospects for success are better than they have ever been. Since everyone else seems intent upon talking about how our glass is half empty, I would like to say why I think that it's half full.

### New leaders

One of the most significant developments in the aftermath of the Nixon administration's most recent adventure in reducing the war by expanding it has been the emergence of new leadership for anti-war forces. The two most important individuals in this category are Maine Senator Edmund Muskie and Common Cause Chairman John Gardner. Until events and George McGovern made it untenable, Muskie was earnestly waffling on the war, giving rise to fears on the part of many including myself that Indochina would again be swept under the rug in the '72 campaign. Apparently he has realized that if he aspires to leadership, he must lead and not equivocate; he has decided to co-sponsor the McGovern-Hatfield resolution calling for withdrawal of all U.S. forces from Indochina by the end of this year. He was also, according to some reports, largely responsible for the Senate Democrat's overwhelming endorsement of a fixed deadline for withdrawal.

Gardner's case is somewhat different. Until recently, Common Cause has placed its emphasis on institutional reform and paid only lip service to ending the war. Now, events and sound-

ings taken of the Common Cause membership have given Gardner enough reassurance that he has announced that he will lead a national citizens' movement against the war, and he just might become a middle-aged Sam Brown.

### Sincerity or expediency?

It is easy for those whose antiwar activities date back to '68, or '65, or earlier to dismiss Gardner and Muskie and other recent antiwar converts as late-comers and question whether their actions are motivated by sincerity or expediency. However, if the war is to end, the ranks of those who oppose it must grow; and national figures like Gardner and Muskie who adopt the minimum antiwar position — total withdrawal by a fixed date — will play a key role.

### Public opinion

The second major new development since last spring has been the emergence of much greater antiwar sentiment among the public at large. I am led to this conclusion by a variety of information: a recent poll showing that 73% of those questioned favor total withdrawal by the end of the year; the student-business Runnymede conference at Endicott house last month which endorsed the same position, with emphasis on the moral equivalence of ground troops and aerial bombing; attitudes which have changed in my own Republican-suburban neighborhood outside Chicago; Harvard Professor George Wald's success in fostering academic-labor cooperation against the war; and the tone of the media.

I think, though of course it is impossible to prove, that this process has been fostered by the relative absence of violence in the anti-war movement since May. With no demonstrations to distract the public, it has been able to observe the endless bloodshed and administration doublethink, which has become increasingly ridiculous as we expand the war to end it by invading Laos to cut the Ho Chi Minh trail. The invasion is "going fine" as South Vietnamese

units are mauled and it is suddenly announced that we didn't really intend to cut the trail; we were just going in to wander around Laos a little. We may later look back and find that the greatest thing that the anti-war movement ever did was quiet down for the past eight months so that Middle Americans could figure things out for themselves.

### New leaders must be included

The implications for the future are clear: to be most effective the leadership of the next attack on the war must include the Muskies and Gardners, with whom large numbers of people who have not heretofore opposed the war can identify. Some earlier antiwar leaders, to whom the country owes a debt it can never repay, seem to be low on ideas and enthusiasm and — more importantly — tend to be dismissed quickly by some segments of the population whose support must be gained.

Many students, I think, now realize that students cannot end the war alone and are anxious or at least willing to seek new allies and will join the next push. The spectre of co-optation is always there, of course, but in a given situation a lot of underbrush can often be cleared away simply by

(Please turn to page 6)

## Teach-ins and rallies

By Alex Makowski

For half a dozen years now teach-ins and rallies have been the standard weapon of the non-militant opponents of our war policy. From the first small gatherings in the corners of our country's campuses to the massing of 100,000 students on the Boston Common, the familiar picture of a speaker exhorting his audience has typified the growing revolt of the intellectuals against the war.

Yet there's something fundamentally unrealistic about this tactic, something that brings activists to a pause occasionally to wonder what it's all for. Maybe

it's the memory of a high school pep rally floating up from four or five years back, or some Hollywood image of a Southern Baptist prayer meeting with its fire and brimstone and gospel hymns. Something keeps nagging at the minds of the students, even as they chant and raise a mystic peace sign.

When the first peace rallies were held during the middle 1960's, there was a definite rationale. Here and there a pocket of liberal scholars or radical agitators would uncover in some little-known book the real story behind our valorous Asian campaign. Spreading their message by leaflet and assembly, they sought to waken their colleagues and peers to the truth behind the glossy *Life* magazine articles. With the advent of Johnson's quest for the military victory and a widening credibility gap, more and more members of the academic community were won over to the dovish stand.

"Where do we go from here?" Many immersed themselves in McCarthy's 1968 campaign, and thrilled to the success of the "dump Johnson" drive. But as the ranks of the righteous swelled, teach-ins and rallies assumed a different character. The widespread familiarity with the facts behind American aggression made a dry, convincing presentation unnecessary — speakers were free to experiment with various techniques for raising their audiences to a fever pitch of excitement and elation. Newcomers, though, were as

often as not turned off by the emotional "our country is stained with blood" approach.

Fall, 1969: one hundred thousand young people jam the Common. This is a pep rally beyond Knute Rickne's wildest dreams, as the students juice themselves up for the title game a month later in Washington.

Fall, 1970: three or four dozen hardy SDS members huddle for protection from the chilly breeze blowing across the 77 steps. Bullhorn at his lips, the speaker repeats the same tired charge that MIT is screwing its workers.

No comparison between the Common and the 77 steps? The only difference is that one rally was more successful than the other — both were aimed at raising the spirits of the troops for the coming battle.

Letters to the editor of The Tech are welcome. They should be typed triple-spaced and sent through interdepartmental mail to The Tech, W20-483. No letters will be cut or edited, but we can only run them subject to space limitations.

Tonight NUC and SACC are sponsoring a teach-in against the war in Laos (and presumably the whole Asian campaign as well). Most of the faces will be new, but the message, the emotions, will all be the same. No doubt the rally will lift everyone's spirits, and there's no denying that the anti-war campaign will need some enthusiasm in the coming weeks, but this meeting must prove more of a beginning than the Common rally did.

Teach-ins should be held in the Kiwanis clubs and union halls, for only there will the doves find large numbers of people waiting to be taught. The problem with past teach-ins was limiting their appeal to the campus, rather than reaching out to the community. Meaningful progress will only be made when the anti-war forces marshal strength outside the universities, and the teach-ins and rallies must be planned accordingly.

## Letters to The Tech

To the editor:

We would like to ask the following questions in reference to your February 19 story: "Poor turnout for 'women-only' class."

1) Does the reporter naturally assume that every woman he sees at MIT is from Wellesley? (Not all of the women in the section were from Wellesley as he reported.)

2) Why, if the reporter bothered to find out that Diane Balsar was once a public school teacher, did he not also bother to find out her name? (He identified her as a "female public school teacher.") Why did he report that Kampf and Chomsky announced the women's section

when in fact Diane announced it? Why was she referred to only as a recitation instructor instead of co-instructor of the course?

3) Why did the reporter not report that although the single male MIT student left after 20 minutes, the six women remained, carrying on a conversation which had begun without Diane and which continued after she arrived? (About 21 minutes late.) Could it be because the reporter suddenly lost his source of information when the single male MIT student left?

4) Why did the reporter expect to be excluded from the class either by decision of the women present or by Diane's decision, but not by a decision reached by all seven women?

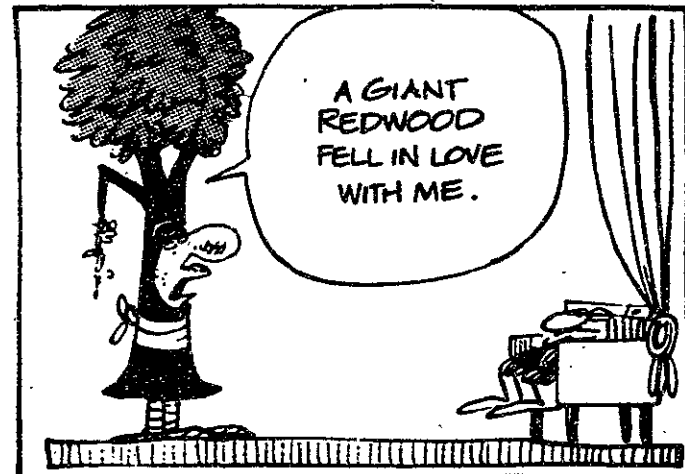
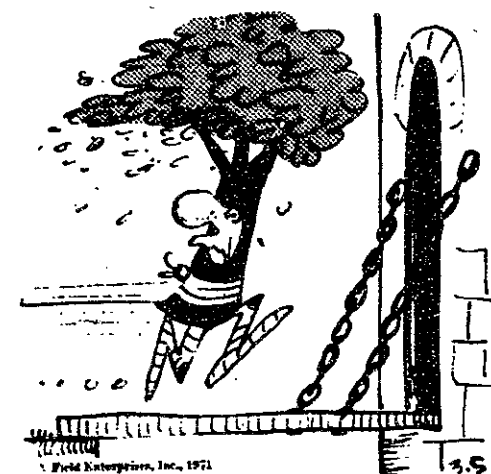
Why should he expect one person to individually have the responsibility for deciding who gets admitted to the class?

5) The quotes he cites as having been said by the women present were complete fabrications. Does the reporter actually believe that people other than reporters talk in that kind of bullshit? ("When questioned why she thought an all female class might be appropriate, another of the students replied that it would be a good way to explore the intellectual and cultural contributions women have made to society.")

6) Why was this the only story on the front page without a by-line?

(Continued on opposite page)

by Brant Parker and Johnny Hart





# Letters to The Tech

(Continued from opposite page)

7) Why did the editors and the reporters of *The Tech* think that they had the right to comment on the poorness or the goodness of the turnout for the class? By what standards was it poor? Should it have been bigger, like Chomsky's section? The seven women did not feel deprived by the lack of 100 other people. Or is it that, at last given the opportunity, of course all women should want to be in a section focusing on women's problems? And the people who know this best are the male editors and reporters of *The Tech*.

Susan Diskin, Sue Levkoff  
Judy Somberg, Ellen Umansky  
Mary Jane Weisburd, Chris Wing

1) One of the six women in the section was indeed from MIT, not Wellesley as *The Tech* reported.

2) Failing to identify Diane Balsar as a co-instructor of the course, rather than a recitation instructor, resulted from lack of information.

3) Obviously, the source of information was the single male MIT student. No attempt was made to imply that the women students left when he did, nor that Mrs. Balsar never showed up at all.

4) This complaint is unfounded. Nowhere does the story imply that the reporter expected that Mrs. Balsar alone would decide whether or not he would stay. The fact that he asked the women present about their feelings demonstrates his realization that they would be sharing in whatever decision was made.

5) Standard practice has always been to enclose someone's quote in quotation marks. Since no quotes were

used in the part of the story referred to, there was no attempt on our part to put any phrasing in this student's mouth. Nonetheless, the fact remains that one of the women students did offer that reason as justification for setting up a "women-only" section.

6) It is *The Tech's* practice to allow an author one byline per page. If a reporter has more than one story on a page, he decides which story will carry his byline; usually he chooses the more important story. Alex Makowski wrote the story in question.

7) We feel *The Tech* is within bounds to comment on the class, since MIT students, through their tuition, are paying the instructor's salary. As for labeling the turnout poor: over two-hundred people are taking the course; there are three recitation sections; six women showed up for the first meeting of this one.

## Expert details birth control

By Lee Giguere

Speaking to a less-than-capacity audience in Kresge, Doctor Irving Cushner presented a detailed analysis of the various methods of "preventing birth" against the background of the totality of human sexuality, from "psychosexual development" to birth.

Modern oral contraceptives, Cushner related, have a pregnancy rate of zero, followed by five per hundred thousand for surgical sterilization.

Cushner discussed the effectiveness of each of the methods, which he defined as "what factors go in to how we select any one of the methods we might use." He listed such factors as: cost, availability when needed, coital dependence, sexual dependence, and socio-cultural factors (religious, legal). He also evaluated each method by the "Pearl Formula" — the number of pregnancies in a group of 100 couples having intercourse two to four times a week for a period of one year. As a reference standard, he noted that if no preventive measures are taken, there would be 83 conceptions per year.

Anti-conceptants, he explained, can be categorized by whether they bar the sperm from entering the vagina or from entering the cervix. In the first category he placed total abstinence, whose effectiveness, he stated is "very low." Related to this is the rhythm method, involving at least 8 days of abstinence, which resulted in 40 conceptions per year. Rhythm, Cushner noted, is both inexpensive and readily available, but may involve heavy emotional and sexual costs.

"Coitus interruptus," while inexpensive and readily available, is usually poorly-motivated, Cushner argued, and has a conception rate of 30. The male condom, widely used for the past 35 years, has a theoretical rating of one to three, but in use is rated at from ten to 15 conceptions per year. The condom, Cushner noted, is "readily available" in most communities "in pharmacies, gasoline stations, and the like." Cushner berated the use of the "post-

coital douche" as "nonsense," since the sperm take only five seconds to reach the cervix.

The final method in this group was vasectomy, surgical sterilization of the male. Its Pearl rating, he noted is .005. "Short of abortion," he stated, "this is the most effective method." Cushner emphasized the permanence of the operation.

Several methods exist to "prevent the sperm from gaining entrance to the cervix" after they have entered the vagina. Chemical preparations, Cushner explained, either immobilize or kill the sperm, but must be placed in the vagina no more than 30 minutes prior to coitus. Pregnancies occur at the rate of 25 to 50 per hundred couples per year using this method.

The diaphragm, "until the pill one of the two most common devices in the country," allowed 15 to 20 conceptions, used with contraceptive foam or jelly, however, Cushner reported that their effectiveness was increased to from ten to 12.

Surgical sterilization of the female, "occlusion of the fallopian tubes," is a very effective method. Cushner noted that until recently it involved abdominal surgery resulting in a five to six day hospital stay. He added that a new method being developed has been very successful and can be performed in only 15 to 20 minutes on an outpatient basis.

Oral contraceptives, "the pill," Cushner continued, prevent ovulation by causing the pituitary gland to alter production of the hormone that brings about ovulation. While oral contraceptives have some noticeable side-effects and should not be taken without a prior medical examination, Cushner emphasized that the risks seemed small. In fact, he noted two positive effects: elimination of painful menstruation, and elimination of acne (oral contraceptives, he said, are the only "internal agents" effective against acne).

The second category of preventive methods falls under the concept of "anti-nidation" — the prevention of the implantation of the fertilized ovum on the

uterine wall. The only way of accomplishing this, Cushner stated, is by means of an intra-uterine device (IUD), which need not be removed. IUD's, he pointed out, have a high effectiveness (one to three on the Pearl scale) and a low incidence of side-effects. An additional advantage of the IUD's is that they require motivation only at the time of their insertion and not at every act of intercourse.

## Schulte sees GA substitute

(Continued from page 1)  
after spring break.

"At the March 23 meeting, we will probably have a rough draft of what we think GA should look like a month and a half from now. For this meeting a quorum is very necessary," said Schulte.

Krzywicki, who is writing the constitution to be presented to the GA, noted that he was combining some of his own ideas with ideas used in the HAC constitution of 1969.

'Information backlog'

He went on to say, "there is a backlog of information that just hasn't gone out to the students over the past few years." In particular, he noted that the process by which one files a petition is not adequately described. "I don't care who hasn't done it, I think we should."

Krzywicki explained that the planned system would not decrease the number of people active in government, but would "reshuffle where people go." It

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## Honesty isn't always the successful play

NORTH  
♦ A-K J 9 8 3  
♦ A 8 3  
♦ 8 4  
♦ 9 2

WEST  
♦ 10 7 2  
♦ J 4  
♦ Q 10 7 6 3  
♦ Q 8 7

EAST  
♦ 6 5 4  
♦ 5  
♦ A-K 9 2  
♦ A-K J 5 3

SOUTH  
♦ Q  
♦ K Q 10 9 7 6 2  
♦ J 5  
♦ 10 6 4

North	East	South	West
1 spade	2 clubs	2 hearts	pass
2 spades	pass	pass	pass
4 hearts	pass	pass	pass

By Daniel Reinharth

The basic premise of this infant column is that bridge is a fun game which does, or at least should, have a wide following here at MIT. I intend to discuss one entertaining and informative hand per column, but will also answer questions if that is desired. Please send all questions, comments, and hands to Dan Reinharth, Bexley Hall, Room 407.

Today's hand provides an illustration of the wide scope of possibilities open to a nimble-minded declarer. The bidding is rather straightforward, and the opening lead against the game contract is the seven of clubs. Before reading on, study the hand. You are the declarer; how do you proceed?

The actual declarer made the same mistake you have probably

just committed — he played low clubs from dummy and from his hand, permitting East to run off the first four tricks, setting the contract.

The correct play would have been for declarer to ruff the opening club lead in his hand with a low heart, followed by cashing the king and queen of hearts, and the queen of spades. A low heart to the ace would enable declarer to discard all of his losing clubs and diamonds on dummy's good spades.

The irate defenders would then justifiably claim a renege, and a two-trick penalty would be assessed against declarer. However, instead of going down, the contract would be made — with an overtrick to boot!

The moral of this story is that in bridge, at least, honesty is not always the best policy.

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Los Angeles, California 90069  
Your resume must be received no later than March 26, 1971.

# IFC attempts revitalization

(Continued from page 1)

was that IFC meetings last term were too often boring or worthless; many houses responded by sending a freshman to represent their house because no upperclassmen were willing.

During the winter the IFC executive committee met to examine on its own the current IFC and possibilities for the future. The excomm members spelled out several important tasks a fraternities' union might perform. Besides running the PMC and rush, IFC could lobby for fraternity interests both to the MIT administration and city and state governments as well. Finally, the IFC could take the responsibility of circulating information among the houses on such necessary topics as finances and community relations.

Associate Dean for Student Affairs Richard Sorenson similarly urged the house presidents to continue some form of joint organization. More attention needs to be paid to the long-range problems like housing that could threaten fraternities in five or ten years; the IFC could be a useful way to begin tackling these problems now. He laid much of the problems IFC experienced over the past year with the houses themselves, upbraiding them for failing to communicate with the IFC officers, and explain what was needed and wanted.

The house presidents responded by ratifying a new constitution. The document provides for an IFC made up of the house presidents (or their designated stand-ins) meeting regularly once a month. The houses retained their right to place a new living group on probation for a year before granting it fraternity status.

Still to be resolved are the issues of a judicial committee and finances. Several houses have complained that there is no real need for a judicial committee — the rush committee, some suggest, could enforce its own rules, while community relations problems are better resolved by the positive method of increasing contact with neighbors than the passive approach of punishing houses that incur the anger

of the community. Outgoing chairman Paul Snover replied that the houses are better off establishing their own judicial system, rather than having to rely on the Dean's office to handle complaints.

As for finances, at least one house has promised it will not join the IFC if the dues are high. Past Treasurer Dave Krackhardt predicted that \$20 a year would suffice for a minimum budget of meetings at MIT, occasional distribution of fact sheets, and the PMC functions, but Snover explained that a more active IFC role would necessarily cost the houses more.

(Ed. note: Below is a statement from Harwell Thrasher, new IFC chairman, outlining the possibilities he sees for the IFC during the coming year.)

The IFC is more than a representative body. It is made up of people who work to promote the interests of the fraternities of MIT. In line with this purpose, I have drawn up a set of goals for a successful IFC.

The main goal for the new IFC is to bring the Interfraternity Conference into closer contact with the individual fraternities and to bring the individual fraternities into closer contact with each other. Many fraternities on this campus have overcome serious problems by using their own initiative and talent, but other fraternities encountering similar difficulties are unaware of the solutions used by their neighbors. This communication problem can be overcome by an effective IFC, through the use of two related methods:

First, the officers of the IFC must keep themselves up to date on all of the important events concerning each house. The officers can bring common problems to the attention of all houses concerned and help them to work out acceptable solutions.

Second, if the problem war-

## PEACE MEAL

To raise funds for Spring anti-war activities. Spaghetti dinner, wine, folk singers. Sunday, March 14, 6:30 pm, Charles St. Meeting House, 70 Charles St., Boston. \$2 per person. Sponsor: Beacon Hill Support Group.

rants it, special purpose meetings can be called. These problem-solving sessions would help the houses deal with the difficulty together? fraternities which have overcome similar obstacles could reveal their methods, thus giving their neighbors an enlightened edge on the situation.

A second goal for the IFC is to reduce fraternity costs. This goes along with the communication goal to the extent that houses in touch with each other will tell each other about new ways to save money, but it extends further than that. MIT fraternities spend approximately \$900,000 per year on rent, utilities, maintenance and food, yet very few of these items are purchased using quantity discounts. Hopefully, the new IFC can save more money by buying in bulk; the houses would certainly benefit.

A final, all-encompassing goal for the IFC is to improve the living conditions at MIT fraternities. There are many aspects of living in fraternities that could be investigated and modified. Coed living is a current, very real example of a major change for fraternities. The Consortium of several MIT fraternities which will move into common living facilities is another. Each of these ideas involves the IFC to some extent, and other "radical" ventures by MIT fraternities will probably also require the cooperation among fraternities that the IFC represents.

The IFC is changing to suit the changing nature of the MIT fraternity system. It is started in a new direction, but to achieve new momentum, it requires help from interested fraternity members. Inquiries are welcome.

# Prospects improving for anti-war effort

(Continued from page 4)

asking: who has co-opted whom?

## Focal points

What will be the focal points of the new assault? Barring a catalytic event (invasion of North Vietnam, introduction of tactical nuclear weapons, etc.) which would immediately focus attention on the Indochina issue, the logical sequence would be to concentrate on passage of the McGovern-Hatfield amendment this year; if this fails, all attention should be directed at the war issue in the '72 Presidential election. If we are fortunate, McGovern and Muskie will provide leadership within the formal political processes and Common Cause will organize and focus outside pressure.

The approach used on the issues will be important. I believe that the American public is concerned about American lives, American dollars, and Asian lives, in that order. This set of priorities is, of course, as immoral as the rest of the war, but it is a political reality with which we must deal. One of the greatest successes of the administration has been its cynical campaign to convince the public that as long as American casualties are reduced, the war is "winding down." The quickest way to begin to crack this attitude and induce public opinion to consider things in a broader context is to begin to talk about the cost of the war (at least \$10 billion yearly, though it's buried in the total defense budget) as McGovern has done in New Hampshire. Again, I believe that the human cost being borne by

Southeast Asians is the most important consideration, but emphasizing it at this immediate time seems less likely to increase anti-war sentiment than some other approaches.

In addition, something must be done to counteract Nixon's use of the POW's to whip up "patriotic" support for his war policies. If there were concern for the 50,000 odd (largely draftees) who are dead as a result of the war appropriately proportionate to that for the 300-1500 POW's who are mostly volunteer pilots and who are at least alive, we would have been out of Indochina a long time ago. Perhaps the point to push here is the fact that the Geneva Convention which everyone quotes but no one obeys stipulates that POW's are to be returned after hostilities cease. While Vietnamization calls for perpetual war with Americans involved at least in providing air support.

On the whole, I am heartened by the prospects for ending the war by 1973. But pitfalls remain. For example, Nixon might try to instigate a new McCarthyism if Congress forces him to withdraw and we "lose" Indochina, particularly if the vote is close and the military is restless. One thing is certain, though: things are starting to happen again, and we had best begin preparations now.

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4:55

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WkndMat 4:40

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# Cyborg permits brain-wave feedback

By David Searls

You, too, can have alpha rhythm. You can have it when you're completely relaxed. You can have it when you're being creative. You can have it when you're practicing zen, yoga, or a number of meditative activities. You can have it when you're dead drunk, or even (according to data that has not, as yet, been totally substantiated scientifically) while you're having sex.

It's just that, until now, you haven't had the capability of detecting your alpha rhythm, which occurs naturally whether you know it or not. The alpha rhythm describes a "state of consciousness" — typical of the conditions mentioned above — which is physically evidenced by a dominance of brain wave patterns in the range of 7.5 to 13 cycles per second. These alpha waves seem to occur with a synchronous firing of neurons in the cortex of the brain — a phenomenon that has been subliminally described as a "stilling of the mind." However, when engaged in "active processing" of stimuli (thoughts, feelings, perceptions), goal-directed studies, and effortful problem-solving activities, desynchronization occurs. Hence, no alpha waves.

All this has been known to researchers for some time, but only in recent years has there been significant work in the field of alpha control. It has been found that an individual, if equipped with a bio-feedback device that tells him exactly when he is experiencing alpha rhythm, can to some extent learn to induce the effect, or even to permit the effect to occur, within himself on a consistent basis.

The means of detecting the occurrence of alpha rhythm is simply the amplification and filtering of brain waves picked up by electrodes on the scalp — when a regular alpha rhythm is found, a switching device is triggered which can convey this information to the subject in a variety of ways: lights, sounds, etc. The individual can thus learn to recognize the state of mind he is in when his mind is usually "at rest."

The results of this alpha conditioning are many and varied: applications can be found in meditation (professional or amateur), psychotherapy, general health, sleep, drugs, creativity, and the arts, learning, and ESP. Where before these activities were limited to scientific investigators, home models of these feedback devices are

now being produced by several companies and are available to the public, though prices for most models approach \$200 because of the nature of the electronics involved.

Cambridge Cyborgs is one of these infant companies. Its units, which sell for \$120 (the cheapest on the market at the present time), are manufactured in a basement laboratory near Harvard Square. The Tech, in the interest of presenting both objective and subjective aspects of the "Alpha-Theta Cyborg," sent this reporter and Bruce Schwartz for a demonstration. We talked to Philip Werlein, who is interested in, among other things, aspects and applications toward learning, and to Michael James, an artist who works on construction of the devices.

"We've been making the cyborgs in small batches — taking orders for five, making them, improving the design based on criticisms from the customers, taking orders for ten more, etc.," said James. "Our latest batch looks like this."

The cyborg is a small blue metal box, about three inches on a side, with two knobs on the top — one controlling the sensitivity, and the other a switch by which one may choose between alpha and theta waves (theta waves being another species, more "sophisticated" than alpha, which come in shorter bursts).

In use, three metal electrodes (covered with steel wool and a conducting paste — "the mess is our biggest drawback") are placed against the scalp, where they are held by a Velcro band. The loop is completed with a pair of earphones which, on various models, emit anything from geiger-counter clicks to a sound resembling distant howitzers.

Werlein noted some interesting aspects of alpha conditioning.

"The most consistent effect is a feeling of relaxation and pleasure. It's interesting, though, that long stretches of alpha seem to be characteristic of any form of traditional meditation — yoga, Hare Krishna, transcendental meditation — independent of methodology. It could very well be that alpha conditioning is a shortcut to some common goal of all these practices, based on very real psychological phenomena. But it doesn't have to be anything so spiritual — it works well for many forms of contemplation, recreation, or just relaxation."

"The bulk of the research in this field is yet to be done — the ideal situation would be to have

one vast laboratory throughout Cambridge. There is no real methodology with the Cyborg, and that's exactly the point. We can't really say we know exactly what we're doing, because all the applications come from the people who try them, and the causes and effects of alpha waves seem to vary widely."

The following is Bruce Schwartz's account of his confrontation with his own mind:

"The Velcro band around my head exerts a gentle pressure. Patches of cool where the electrolyte paste contacts my scalp. After a moment I am unaware of the plugs in my ears, save for the hiss coming up the wires from the grey metal box in my palm, box labeled 'Alpha Cyborg.'"

"Technically, I am now the alpha cyborg, machine-man combination, mental/electronic/audio feedback loop. Object is to get my brain to produce alpha waves, which will be picked up by machine, which will produce audio pulse, which will stimulate me to reproduce thought pattern which produces alpha, which ..."

"How to? Think happy thoughts? I clench my teeth, open-shut-open, several times. This produces galvanic muscular current, unfortunately detected as alpha by machine, which emits pulse into earplugs 'crak-fissh' like rifle shot underwater. Crak-fissh. Crak-fissh. The first few times, the sound startles me. Visceral fear response. No alpha yet."

"Relaxing my jaw to eliminate muscular currents, I sit back and wait for my brain to move in alpha patterns. Relax and let mind float. Driftttt, relax, stare at ceiling, at light bulb, at Dave, Mike. Stare at plastic translucent wireflower. Wait for alpha in bright basement."

"A great feeling of no other way to describe it but peace begins to creep over me as my mind seems to switch from reactive to contemplative mode. No desire to move, to speak, to do anything but STARE AT THE WIREFLOWER crak-fissh CRAK-FISSH jump, I am frightened. Hissss. Was that alpha? Try again, relax and stare think alpha alpha alpha alpha alpha like hare krishna alpha alpha CRAK-FISSH crak-fissh crak crak crak! Rapidfire stac-

cato M-16 pow pow pow crak crak crak pow crak pow crak 'pow!' crak 'pow!' crak 'pow!' A geigercounter burst of alpha, wheat bulb on the box winking blinking, in my head: hear sound of crak-fissh think pow! and another crak follows. I'm in a feedback loop. This goes on ten seconds, then I make conscious effort to break train of thought. Cracking and blinking cease.

"I got quite a burst there," I tell the others, calmly, sedately, in a voice I do not quite recognize as my usually-manic-or-depressive own.

"Words do not accurately describe how I felt at that moment, or later in the session. Useful adjectives include high, contemplative, withdrawn but aware, relaxed, at peace, content, satisfied (satisfied?), conscious-of-self but not self-conscious."

"Analytic-type thinking did not cease entirely, but it disappeared almost completely during intense bursts of alpha activity. Free association brought on the bursts, and the bursts tended to stimulate more free associative thought, as for example:

"Sitting here in bright basement I waiting for alpha alpha alpha hare hare krishna (to music) hare krishna, hare krishna, krishna krishna, hare hare crak-fissh pow! Ah there we go crak-fissh, crak crak crak pow pow pow wow wow the sound I've gotten to like the sound (craks continue throughout — sorry hard to write about) the sound is pleasant machinegun pleasant ha! pow. pow. pow. Weird I'm sitting here enjoying bullet sound machine gun mow people down down pow pow pow (thoughts jumble, come simultaneously, and lately, music, especially bagpipe and organ) guns in full roar battle Black Watch march over hill bagpipes skirl/break/moment later craks resume stare at light bulb the sound, it's the sound I like now it's not conscious it's not because I want alpha rhythms it's only the sound I like like ringing a bell for Pavlov's dogs I'm a dog, salivating dog, the dog is salivating the dog is salivating the dog is salivating."

vating 'The dog is salivating.'

"What?"

"The dog is salivating. Now why is the dog salivating?"

"Well, it seemed important at the time. Or unimportant. Everything was about equally important. The room was interesting to explore. At one point I got up, walked about, contemplating things, alpha crak-fisshing in my head. But I was pretty much devoid of motivation, finally lapsing into a thoroughly relaxed state in which all I wanted to do was listen to the alpha symphony on and on. A great pacifier, I said."

"After my session with the Alpha Cyborg that said 'Crak-Fissh,' I tried out another unit, a smaller box with only one ear plug. Its call was not as interesting as the first's: merely a click. It seemed a bit less sensitive, but after a little manipulation I got it going, free associating like mad, dreaming up music, and fantasizing. A waking dream."

"The Alpha Cyborg seems, for me at least, to work best as a device for achieving meditative and/or fantasy states. The session left me feeling content, placid, and relaxed — though vaguely bothered, in a strictly abstract fashion (worry would have been impossible the way I felt) about what might happen if someone wanted to pacify a population."

"On the other hand, might not the Cyborgs provide means for dissipating aggressiveness and tension that can find no acceptable outlet in advanced industrial societies? Might it not be feasible that machines could help man to bear the stresses imposed upon his social structure by machines in the first place?"

"I had no, answers then; I have none now."

"But I slept very well that night and felt excellent all the next day and into the evening."

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# Tunable lasers possible

A new technique for producing wavelength-tunable infrared light from a laser source has been developed at the Institute.

Reporting in the journal, *Applied Physics Letters*, the developers expect the system to be useful in endeavors ranging from monitoring the air pollution over a city to synthesizing complicated chemical compounds in the laboratory.

Professor C. Forbes Dewey, Jr., of the Department of Mechanical Engineering, and Dr. Lon Hocker, a research associate, developed the new system in MIT's Fluid Mechanics Laboratory.

## Conventional lasers

Conventional lasers produce light at fixed and specific wavelengths. Since lasers came into general being a decade ago, some 100 to 150 different kinds have been developed, each emitting at a specific wavelength. The fixed-wavelength character of conventional lasers makes it highly unlikely that a particular wavelength of interest will coincide with an available laser emission line.

A tunable laser, on the other hand, produces wavelengths over a continuous band, and the spectral output is selectable just as a radio transmitter can be tuned to any wavelength in a certain continuous band.

Tunable lasers which use a fluorescent organic dye as the lasing material are available. But these emit over a limited range of wavelengths (from about .34 to about 1.1 microns) and this does not include the infrared region. Previous methods of tuning fixed-wavelength lasers in the infrared required the use of sensitive optical cavities or superconducting magnets. These conditions have restricted operation to narrow spectral ranges that require sophisticated laboratory environments. In contrast, the new system developed at MIT is broadly tunable and operates at high power levels without special ancillary equipment.

## 'Fingerprinting'

Dewey expects his system to prove useful in infrared absorption spectroscopy — the process of "fingerprinting" a molecule by noting the specific wavelengths at which it absorbs its infrared radiation. The type of bond between the atoms in a molecule has its own set of wavelengths.

The absorption by intramolecular bonds of specific infrared wavelengths is related to the normal modes of molecular vibration. It is thus possible to excite — or to break — specific

bonds in a molecule in a way analogous to Caruso's famous ability to break a crystal goblet with his voice. In both cases, the point is to drive at exactly the correct wavelength, and with sufficient power.

## Pollution applications

Also, the system might be used to measure air pollution over a city. One would pick an infrared wavelength which is absorbed by a pollutant in question and set the tunable laser to that wavelength. The laser beam would be aimed at a mirror on the other side of town. The amount the reflected beam is dimmed would provide a measure of the average concentration of the pollutant along the crosstown path of the laser beam. (Pulsed infrared lasers are 10,000 times less dangerous to the eye than visible lasers, and can be rendered harmless by using appropriate optics.)

The tunable infrared laser system consists of two lasers of conventional types whose beams are combined in a crystal with special optical properties to produce a difference of "beat" frequency. The output frequency is the difference between the frequencies of the two lasers. (Frequency is inversely proportional to wavelength. A common example of a difference frequency is the warbling heard when listening to two sounds of very slightly different frequency.)

## Prototype

In the MIT laboratory prototype, part of the beam from an ordinary ruby laser is drawn off to power a tunable dye laser operating in the visible range. The dye laser beam and the remainder of the ruby laser beam are combined in a lithium-niobate crystal, properly oriented with respect to the laser beams, to produce the difference frequency. By tuning the dye laser in the visible range, the infrared output wavelength was made to vary between three microns and four and a half microns. The prototype system was able to emit over six kilowatts of power in 20-nanosecond pulses. Minor modifications currently in progress should increase the output power many fold.

Dewey feels it should be possible to tune between two microns and 13 microns using currently-available technology, and that the longer-wavelength limit should be extendable to 25 microns when better nonlinear crystals become available.

## Theories

Theories describing the gen-

eration of a difference frequency between two laser beams were published soon after the first laser was demonstrated. The key to accomplishing this in practice was to synchronize the emissions from two lasers to within a few nanoseconds.

The wavelength of a conventional laser's output is determined by the size of the quantum energy jump which the lasing material undergoes; the greater the quantum energy jump, the shorter the wavelength.

In a tunable dye laser, the lasing material — a very large organic dye molecule with many degrees of freedom in its internal vibrations — has so many possible quantum energy jumps that it provides an effectively continuous range of possible output wavelengths. The problem is then to select the particular quantum energy jump — and thus output wavelength — that is desired.

## 'Stimulated emission'

The key to the operation of a laser is the "stimulated emission" effect. Once a molecule of lasing material has been raised to a higher quantum energy level, it will eventually drop back down to a lower level, releasing when it does a photon of light whose wavelength is inversely proportional to the amount of the quantum energy jump which produced it. It happens that when this photon passes a neighboring molecule which is still in the higher quantum energy level, that molecule will be stimulated to emit its photon at that time.

If the process of stimulated emission takes place between a pair of perfectly parallel mirrors, then the photons will all travel together back and forth between the two mirrors, increasing their number as they go. If one of the mirrors is only partially-reflecting, then the escaping photons form a laser beam.

In a tunable dye laser, the fully-reflecting mirror is replaced by a diffraction grating device which reflects different wavelengths at different angles. The diffraction grating and the mirror, then, will be equivalent to perfectly-parallel mirrors for only one wavelength — and that is the wavelength at which the dye laser will operate. That wavelength can be changed by merely rotating the diffraction grating slightly.

The research of Dewey and Hocker was supported in part by the Advanced Research Projects Agency of the Department of Defense, monitored by the Office of Naval Research.

# New officers named to top AA positions

By Randy Young

In a meeting to select next year's officers and executive members, the MIT Athletic Association elected John Kavazanjian '72 president. Ed Kavazanjian '73 was elected secretary, and Dave Wilson '73 and Steve Cochi were elected members-at-large. The newly elected officers will take office April 1.

The race (or, more appropriately, scramble) for the presidency was marked by two sets of nominations, in which several candidates declined to run and neither of the two original nominees was elected.

Dave James '71 and Steve Gass '72 were nominated for president, but when the issue was brought to a vote, a general agreement could not be reached and nominations were reopened.

At this time, both Cochi and Ed Kavazanjian were nominated, but both declined to run. John Kavazanjian and Wilson were also nominated, with Kavazanjian being elected on a preferential ballot.

The major duties of the AA president consist of providing student-administration liaison

and coordinating the various activities of the MIT athletic organizations. The president sits on the Athletic Board, the governing board of MIT athletics, which is composed of faculty, administration, and alumni. He is also a member of the Athletic Facilities Planning Board, the body charged with overseeing use and development of the Institute's athletic plant.

The AA itself serves to manage intramural athletic programs as well as intercollegiate sports. All varsity team captains are voting members of the Association. It was through AA action that the water polo and women's sailing squads were granted varsity status.

The newly elected officers will replace outgoing president Bob Schulte, secretary Pete Sanders '72, and members-at-large Paul Sullivan and Mike Chrzanoski '71. Ken Weisshaar '72, incoming Intramural Council chairman, will also replace Gerry Loe '71 as a member of the executive committee. Varsity Club president Dave Peterson's successor will be chosen at an upcoming meeting of the Varsity Club.

# More research: key to economic growth?

Increased expenditures for research, contrary to popular impressions, do not necessarily lead to increased economic growth or technical progress, according to Dr. Lester C. Thurow, MIT Professor of Economics and Management.

In an article in the current March issue of *Technology Review* Thurow acknowledges that technical progress is the basic ingredient that makes economic growth possible.

But, on the basis of US economic history since 1940, Thurow says there appears to be insufficient evidence to support the idea that more research and development expenditures lead to more technical progress.

"To some extent, the recent cut-backs in research funding by the Nixon administration have been justified by the idea that the frontiers of scientific and engineering knowledge have been advancing... much faster than the... most productive systems actually in use."

## Cut funds?

According to that hypothesis, Thurow says, "It follows that funds for scientific and engineering advances should be cut while more emphasis is placed on using the scientific and engineering advances that have already been made."

"If this view were realistic, it would be possible to accelerate technical progress while at the same time cutting back on funds allocated to research."

"Several comments must be made about this hypothesis. First, no one knows whether the frontiers of science and engineering are now farther ahead of the frontier of operating techniques than they have been in the past. No one knows, because no one has a method for measuring such a distance. Second, no one knows what the relation is between the speed of movement of the distribution of operating techniques and the speed of movement of the frontiers of science and engineering. Does a big gap engender a more rapid

movement... (rather as, in foggy weather, one would drive faster if one could see farther) or does the distribution of operating techniques move at its own pace regardless of the pace of engineering and scientific advance?"

## 'Empirical observation'

"One empirical observation is possible. Measured rates of growth of productivity do not seem to have increased with the acceleration of research expenditures during World War II or with the acceleration of research expenditures in response to Sputnik. Economic historians are in disagreement as to whether postwar productivity is growing faster than prewar productivity; if there is a difference, it is very slight. No one maintains that there has been any increase in the rate of growth of productivity after the Sputnik jump in research expenditures. There is also no evidence of any gradual acceleration of productivity during the postwar period."

# Announcements

\* SCEP elections will be held Monday, March 22 at 8 pm in room 400 of the Student Center.

\* Application may be made to the Activities Development Board to obtain funds for capital expenditures and for minor space renovation. Recognized MIT community activities are eligible. Application forms may be obtained in room 7-101. Applications submitted by March 15 will be acted upon by March 23.

\* Jobs in Europe still available for summer 1971 through IAESTE. Deadline is March 26. Contact Foreign Study Office, Room 10-303, for information and applications immediately.

\* Tech Show '71 is looking for people who have written or would like to write original one-act plays with or without music. We seek several original short plays to present in a coffee-house format during late April and early May. If interested in authoring, composing for, or working on such productions, come to a meeting 7:30 pm Thursday March 18th, Student Center Room 439, or phone Jeff Meldman at 876-0613 or Gerry Berstell x3166.

\* Auditions for the MIT Community Players' May

production of "Rosencrantz and Guildenstern Are Dead" will be held on March 14, 15, and 17 from 7:30 to 9:30 pm in room 1-132. Technical positions are also open. For more information call extension 5687 or 491-6709.

\* The Greater Boston Youth Symphony Orchestra (GBYSO) will perform a variety of Jewish music and other works Sunday, March 21, at 7:30 pm in Kresge Auditorium. Admission is free and all are welcome.

\* The MIT Baton Society wants to remind all aspiring MIT Mesitersinger about the 1971 All Tech Sing, scheduled for May 1, and to announce that entry forms are now available. Anyone interested in entering MIT's traditional friendly vocal competition should fill out an entry form by March 25. Auditions will be scheduled during the week of April 5. For forms or information contact Ron Cohen, x2551, or Steven Haflich, 354-5499.

\* The Boston University Journal presents "Eric Bentley sings Bertolt Brecht," Thursday, March 25, 1971, at 8 pm in the Boston University Auditorium, 602 Commonwealth Avenue. The program is sponsored by the German Center Boston and B.U.

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